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ON THE TIME OF DAY AT WHICH BIRDS LAY THEIR EGGS.

By Robert Miller Christy.

In the year 1876 there was a brief discussion in 'The Zoologist' on the above subject. It was started by Mr. J. Cordeaux, who said (p. 4983) he had observed that after a Carrion Crow's first egg is laid the hen bird may always be found on the nest between the hours of 3 and 5 p.m. He had searched ornithological works for the purpose of learning at what hour out of the twenty-four birds usually deposit their eggs, but the only reference to the subject he had been able to find was a note by the late Dr. Saxby, who said (Zool. 1862, p. 8166):—"Careful observation on twenty different species of our Insessorial birds has enabled me to ascertain the fact that, as a general rule, they lay their eggs between the hours of 7 and 12 p.m."

Mr. F. Boyes, of Beverley, soon after (Zool. 1876, p. 5115) wrote that he thought 8 a.m. was nearer the time, and he suspected that by accident Dr. Saxby had written "p.m." instead of "a.m." A few pages later (p. 5161) Mr. S. H. Saxby, the brother of Dr. Saxby, says he has no doubt this surmise is correct, but he cannot discover the passage in the original MS. He had been told by a very accurate observer that among poultry and caged birds each successive egg is, as a rule, laid later in the morning than the previous one. Mr. C. M. Prior (Zool. 1877, p. 53) says that he believes the usual laying-time to be still earlier in the morning, although not in the middle of the

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night. He was once interested in watching the nest of a Green Woodpecker. On three mornings he visited the nest at 5.15 a.m., when he always found another egg deposited. On the fourth morning he went at 4 a.m., when he found the bird on, but no fresh egg; it had, however, been laid by 5.30 as usual. He had always noticed, when out about six o'clock on spring mornings, that nests he had previously found contained another egg.

This short discussion seems to have satisfied the gentlemen who took part in it, although it left the matter in almost exactly the same unsatisfactory condition as before; but I had become a little interested in it, so I at once commenced to make a few observations, which I have carried on as opportunity offered until the present time, and which it is my intention to describe in this paper. I may remark that this subject would doubtless have been thoroughly worked out long ago had it not been for the fact that many more difficulties surround it than are at first sight apparent. In the first place, observations can only be carried on at one period of the year; it is necessary to live quite in the country or in a large garden where many birds build; the nests should next be found, and should be visited in the evening, and again by rights between four and five the next morning; a mid-day visit is also necessary, yet care must be taken not to disturb the bird or go too often; the nest, to afford opportunities for observation, must be not too far removed from one's house, and if each visit entails a stiff climb up a tree or a wade through mud and water the difficulties are not lessened.

These difficulties, then, must excuse the paucity of facts collected, although they show approximately the laying-times of about thirty different common inland birds. I have not thought it desirable to give the localities, but I may state that they were all in Essex, Yorkshire, or Sussex.

On May 14th, 1880, an English Partridge laid an egg between 7 a.m. and 6.30 p.m. Next day the bird was on the nest at one o'clock, and was, I believe, laying. A Moorhen, whose nest I found at 8 a.m. on July 2nd, 1877, had two eggs, but by 5 p.m. had three. No more were laid until 2 p.m. the next day, when some one took the eggs, so I substituted three stones, and the next day the bird laid another egg in the early part of the afternoon. The following day there was no egg laid, but the day after one was deposited, I believe between 10 and 11 a.m. The next day there was no addition made, and after that I discontinued observing. It seems from this that the Moorhen lays every alternate day, and within an hour or two of mid-day. Another nest, which had three eggs at 8 a.m. on May 26th, 1880, had no more at 12, but another was deposited between that time and 8 p.m. Next day none were laid up to 6 p.m., but between that time and 6 the next morning another had been laid. Between 8 that evening and 6 the following morning another was laid; after that I breakfasted on the eggs!

I have enquired of two of our chicken-women as to the time Fowls lay, and have obtained from each exactly the same reply, although one was more precise than the other. According to them the first egg is laid early in the morning, but varies somewhat according to the time of year. Each successive egg after that is laid an hour or an hour and a half later than the previous one until the time comes to be about 1 o'clock, then a day is missed and laying in the early morning is again resumed. This agrees closely with what Mr. S. H. Saxby says. Ducks seldom lay but early in the morning.

I do not know what time of day the Kestrel lays, but it is stated in Dresser and Sharp's 'Birds of Europe' that one kept in confinement only laid every alternate day; and so, apparently, did one which I found with one egg on May 18th, 1877, as it had only three on the 23rd.

The Barn Owl is said to deposit its eggs in pairs at intervals of several days. I once saw a Missel Thrush on her nest, and I believe laying, at 10 a.m. Another bird, in 1877, had one egg at 7 a.m. and three on the evening of the next day, so that she must have laid some time during the day. I found two Blackbirds' nests on April 15th, 1880, at 8 a.m.; at 12 one had another egg, but the other had not. Next day an egg was laid between 8 and 11.45 a.m. A nest in our garden had two eggs at 7 a.m. on April 25th last, and three at 12; next day the egg was laid by 10.15.

The first Thrush I watched was in 1877, and she laid between 7 a.m. and the evening. The next one laid between 6.45 a.m. and 2 o'clock; next day the same bird was on laying at 10 a.m., and the day after between 9 and 10 a.m. Another bird, in 1877, laid about 11 o'clock. Another laid between 1 p.m. and 7 a.m.

Up to 7 p.m. the next day no more were laid, but by 10 there was another. Another bird laid an egg after 12 in the day, and another between 7 a.m. and the evening. On the 22nd and 24th of March, 1879, a Thrush was on her nest laying at exactly 11.9 a.m., but at 10.45 on the 26th.

On June 22nd, 1877, a Spotted Flycatcher laid before 10 a.m., and on June 6th, 1881, another laid before 7 a.m. On July 3rd, 1877, a Sedge Warbler laid her first egg before 9 a.m., before 7.30 next day, and before 6.30 the day after. A Garden Warbler laid an egg before 7 a.m. on May 17th, 1880. On June 10th, 1879, a Wheatear laid its second egg before 11.30 a.m., the next egg between 5 that evening and 11.30 next morning, and the fourth egg before 6.45 the morning after. A Yellowhammer's nest which I watched had no fresh egg up to 10 a.m. on June 21st, 1877. A Sky Lark's nest which I found one evening in May, 1880, received no more eggs up to 2 p.m. the following day; but another nest, which I found in May last, had two eggs one evening and three by 5.15 the next morning, but no more up to 7 p.m. My friend Mr. J. B. Ellis, of Leicester, watched a Lark's nest, which received an egg between 3 and 5 p.m. on June 4th, 1879.

On May 7th, 1880, I discovered a Chiffchaff's nest, which had received an egg before 12 o'clock. Three other eggs in the same nest I ascertained to have been laid before 8, 6, and 6 a.m. respectively, and since the previous evening. On the same day a Willow Wren laid an egg before 6 a.m., but since the previous evening. Two Linnet's nests, which I watched on May 4th, 1881, each received an egg before 7 a.m., and the next day one of them had another before 6 a.m.—in each case since the previous evening. Mr. Ellis watched a good many Linnets in 1879, and they always laid before 7 a.m., though sometimes they missed a day. A Canary, whose nest I watched in May, 1878, laid in the morning before 7, but two eggs belonging to a second brood were deposited about 8.30 and 7.30 a.m. respectively.

A Chaffinch was watched in April, 1880, and laid before 7 a.m., but nothing more was added up to 6.30 p.m. A few days later two Chaffinch's nests received no eggs between 8 a.m. and 6 p.m., but both had another before 7 next morning. In 1882 a Chaffinch laid between 6.15 p.m. and 9 a.m., and between the evening and 9 a.m. the next day. In 1880 I believe a Greenfinch laid about 7 a.m. In May, 1881, I had one under observation which laid between 7 p.m. and 5 a.m. At the end of April last another bird laid between the evening and 10 the next morning; at 10.15 a.m. on the 28th four birds had each laid an egg since the previous evening; a few days later two other birds laid between the evening and 9 the next morning.

A Sparrow, in 1877, laid before 8 a.m.; in 1880 one laid between 7 p.m. and 5.30 a.m.; in 1881 another laid between 7 p.m. and 5 a.m., but no more had been laid up to 11 o'clock the following night. A Wren which I watched laid an egg, I believe, during the night. On May 12th, 1881, I found a Creeper on her nest (which I was watching), and I believe laying, at 4.45 a.m. On April 19th last, at 5 a.m., there were two eggs in a Nuthatch's nest, but five at the same hour on the 22nd, so I conclude that the eggs were deposited before 5. Three Swallow's eggs, watched in 1879, were laid some time during the night, one before 6.45 and the other two before 9 a.m. In March, 1880, a Rook's nest contained two eggs at 5 p.m. I did not visit it next day, but the day after there were four at 10 a.m., and no more up to 5 p.m., so that probably one had been laid early that morning.

On September 14th, 1879, a Ring Dove's nest had one egg at 5 p.m., but two at 5.45 next morning. On March 21st, 1880, another nest had one egg at 3.30 p.m., but two at 8.45 next morning. On May 26th, 1880, I found a Ring Dove's nest with no eggs in the evening; by 6 a.m. there was one egg, but no more were laid up to 6 the following morning, although another was deposited during that day. At 7.30 a.m. on July 4th, 1877, there were two eggs in a Stock Dove's nest which had only contained one the previous evening. At the same time I found two eggs in a hole that had contained none on the 2nd. Another bird that had one egg at 3.15 p.m. one day, had no more at 7 next morning, but had perhaps forsaken. At 7 a.m. on May 26th, 1880, a Stock Dove had one egg, and no more up to 11.45 a.m. next day, but at 6 p.m. there were two. On June 11th, 1880, a Turtle Dove laid its first egg between 8 a.m. and 7 p.m. I have watched the tame Pigeons in our pigeon-house: one laid its second egg between 12 and 4, another between 11 a.m. one day and 10 the next, another between 9.45 and 4 p.m., while another bird laid its first egg between the evening and 9.45 next morning.

These observations seem to show that the Pigeons all lay their eggs about the same time of day; the second egg being deposited at a different hour from the first—the latter early in the morning and the former early in the afternoon of the next day.

The observations further show, I think, that each species of bird has a special hour of the twenty-four at which it lays its egg, and that birds belonging to the same genus have often just about the same hour. Most of our small birds—warblers, finches, and the like—seem to deposit their eggs at some time in the early morning; the *Turdidæ* at about 10 or 11 in the forenoon, and some other species about mid-day.

Nevertheless these statements do not invariably hold good, as reference to the foregoing paragraphs will show. Sometimes birds are an hour or two later, or occasionally earlier, than their usual time, while sometimes they miss a day altogether. Cold also retards or prevents laying. Thus, in the middle of April, 1879, there came some very cold weather, with sharp frosts and snow several inches deep, and a Blackbird in our garden commenced to sit on two eggs. The snow pressed upon the nest and all but overturned it, but I put it back in position, and the old bird continued sitting, considerably to my astonishment.

Assuming that Dr. Saxby meant *a.m.* instead of *p.m.* his observations, above quoted, although they differ from mine, may be correct for the high northern locality in which they were presumably made, namely, Shetland.

I need not point out on how small a number of birds my observations have been made, nor how many genera there are on which I have not at present a single observation. I offer these few facts, however, such as they are, in the hope that they may be of use to others who may be glad to pursue the enquiry further.

A WAVE OF LIFE.*

By W. H. Hudson, C.M.Z.S.

For many years, while living in my own home on the Pampas, I kept a journal, in which all my daily observations on the habits of animals and kindred matters were carefully noted. Turning back to 1872-3, I find my jottings for that season contain a history of one of those waves of life—for I can think of no better name for the phenomenon in question—that are of such frequent occurrence in thinly-settled regions, though in countries like England, seen very rarely, and on a very limited scale. An exceptionally bounteous season, the accidental mitigation of a check, or other favourable circumstance, often causes an increase so sudden and inordinate of small prolific species, that when we actually witness it we are no longer surprised at the notion prevalent amongst the common people—that mice, frogs, crickets, &c., are occasionally rained down from the clouds.

In the summer of 1872-3 we had plenty of sunshine, with frequent showers; so that the hot months brought no dearth of wild flowers, as in most years. The abundance of flowers resulted in a wonderful increase of Humble Bees. I have never known them so plentiful before; in and about the plantation adjoining my house I found, during the season, no fewer than seventeen nests.

The season was also favourable for mice; that is, of course, favourable for the time being, unfavourable in the long run, since the short-lived, undue preponderance of a species is invariably followed by a long period of undue depression. These prolific little creatures were soon so abundant that the dogs subsisted almost exclusively on them; the fowls also, from incessantly pursuing and killing them, became quite rapacious in their manner; whilst the Sulphur Tyrant-birds and the Guira Cuckoos preyed on nothing but mice.

The domestic cats, as they invariably do in such plentiful seasons, absented themselves from the house, assuming all the habits of their wild congeners, and slinking from the sight of man—even of a former fireside companion—with a shy secrecy in their motions, an apparent affectation of fear, almost ludicrous to see. Foxes, Weasels, and Opossums fared sumptuously. Even for the Common Armadillo (*Dasypus villosus*) it was a season of affluence, for this creature is very adroit in capturing mice. This fact might seem surprising to anyone who marks the uncouth figure, toothless gums, and the motions—anything but light and graceful—of the Armadillo; and perhaps fancying that, to be a dexterous mouser, an animal should bear some resemblance in habits and structure to the Felidæ. But animals, like men, are compelled to adapt themselves to their surroundings; new habits are acquired, and the exact co-relation between habit and structure is seldom maintained.

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* From 'The Field' of Feb. 3, 1883. Communicated by the author.

I kept an Armadillo at this time, and good cheer and the sedentary life he led in captivity made him excessively fat; but the mousing exploits of even this individual were most interesting. Occasionally I took him into the fields to give him a taste of liberty, though at such times I always took the precaution to keep hold of a cord fastened to one of his hind legs; for as often as he came to a kennel of one of his wild fellows, he would attempt to escape into it. He invariably travelled with an ungainly trotting gait, carrying his nose, beagle-like, close to the ground. His sense of smell was exceedingly acute, and when near his prey he became agitated, and quickened his motions, pausing frequently to sniff the earth, till, discovering the exact spot where the mouse lurked, he would stop and creep cautiously to it; then, after slowly raising himself to a sitting posture, spring suddenly forwards, throwing his body like a trap over the mouse, or nest of mice, concealed beneath the grass.

In the autumn of the year countless numbers of Storks (*Ciconia maguari*) and of Short-eared Owls (*Otus brachyotus*) made their appearance. They had also come to assist at the general feast.

Remembering the opinion of Mr. E. Newman, quoted by Darwin, that two-thirds of the Humble Bees in England are annually destroyed by mice, I determined to continue observing these insects, in order to ascertain whether the same thing occurred on the Pampas. I carefully revisited all the nests I had found, and was amazed at the rapid disappearance of all the Bees. I was quite convinced that the mice had devoured or driven them out, for the weather was still warm, and flowers and fruit on which Humble Bees feed were very abundant.

After cold weather set in the Storks went away, probably on account of the scarcity of water, for the Owls remained. So numerous were they during the winter, that any evening after sunset I could count forty or fifty individuals hovering over the trees about my house. Unfortunately they did not confine their attentions to the mice, but became destructive to the birds as well. I frequently watched them at dusk, beating about the trees and bushes in a systematic manner, often a dozen or more of them wheeling about one tree like so many moths about a candle, and one occasionally dashing through the branches until a Pigeon—usually the *Zenaida maculosa*—or other bird was scared from its perch. The instant the bird left the tree they would all give chase, disappearing in the darkness. I could not endure to see the havoc they were making amongst the Oven-birds (*Furnarius rufus*—a species for which I have a regard and affection almost superstitious), so I began to shoot the marauders. Very soon, however, I found it was impossible to protect my little favourites. Night after night the Owls mustered in their usual numbers, so rapidly were the gaps I made in their ranks refilled. I grew sick of the cruel war in which I had so hopelessly joined, and resolved, not without pain, to let things take their course. A singular circumstance was that the Owls began to breed in the middle of winter. The field-labourers and boys found many nests with eggs and young birds in the neighbourhood. I saw one nest in July, our coldest month, with three half-grown young birds in it. They were excessively fat, and, though it was noonday, had their crops full. There were three mice and two young Cavies (*Cavia australis*) lying untouched in the nest.

The Short-eared Owl is of a wandering disposition, and performs long journeys at all seasons of the year in search of districts where food is abundant; and perhaps these winter-breeders came from a region where scarcity of prey, or some such cause, had prevented them from nesting at their usual time in summer.

By August (1873) the Owls had vanished, and they had, indeed, good cause for leaving. The winter had been one of continued drought; the dry grass and herbage of the preceding year had been consumed by the cattle and wild animals, or had turned to dust, and with the disappearance of their food and cover the mice had ceased to be. The famine-stricken cats sneaked back to the house. It was pitiful to see the little burrowing Owls; for these birds, not having the powerful wings and prescient instincts of the vagrant *Otus brachyotus*, are compelled to face the poverty from which the others escape. Just as abundance had before made the domestic cats wild, scarcity now made the Burrowing Owls tame and fearless of man. They were so reduced as scarcely to be able to fly, and hung about the houses all day long on the look-out for some stray morsel of food. I have frequently seen one alight and advance to within two or three yards of the door-step, probably attracted by the smell of roasted meat. The weather continued dry until late in spring, so reducing the sheep and cattle that incredible numbers perished during a month of cold and rainy weather that followed the drought.

How clearly we can see in all this that the tendency to multiply rapidly, so advantageous in normal seasons, becomes almost fatal to a species in seasons of exceptional abundance. Cover and food without limit enabled the mice to increase at such an amazing rate that the lesser checks interposed by predatory species were for a while inappreciable. But as the mice increased, so did their enemies. Insectivorous and other species acquired the habits of Owls and Weasels, preying exclusively on them; while to this innumerable army of residents was shortly added multitudes of wandering birds coming from distant regions. No sooner had the herbage perished, depriving the little victims of cover and food, than the effects of the war became apparent. In autumn the earth so teemed with them that one could scarcely walk anywhere without treading on mice; while out of every hollow weed-stalk lying on the ground dozens could be shaken; but so rapidly had they been devoured by the trained army of persecutors, that in spring it was hard to find a survivor, even in the barns and houses. The fact that species tend to increase in a geometrical ratio makes these great and sudden changes frequent in many regions of the earth; but it is not often they present themselves so vividly as in the foregoing instance, for here we see countless myriads of highly organised beings rising into existence only to perish almost immediately, scarcely a hard-pressed remnant remaining after the great reaction to continue the species.

THE BIRDS OF LAMBAY ISLAND, CO. DUBLIN.

By H. Chichester Hart, B.A.

The island of Lambay, 595 acres in extent, lies off the coast of Dublin, about two and a half miles from the nearest point of that county at Portrane. The coast-line is high and precipitous, with the exception of a small sandy bay at the harbour and a short stretch of low shore on the west and south-west side of the island. Its margin is about seven miles in length, and the shape is roughly hexagonal. The cliffs vary in height to about 250 ft., and are sheer for a considerable distance in many places, as on the north-east side, west of Freshwater Bay, and on the south-east cliffs below Raven's Well.

There is little timber on Lambay; a small planting of sycamores at the castle, and a stunted growth of shrubs, such as blackthorns, brambles, &c., in a few places, is all the shelter of this nature the island affords.*

There are two or three resident families of peasants, and a large partly-ruined, partly-inhabited castle, with a good deal of cultivation at the south and south-west of the island. Elsewhere it is a heath, affording good pasture, with a few small rivulets and a slight marsh or two. The chief produce of the island is that of a dairy farm and a rabbit warren.

Lambay is the chief resort for cliff-breeding birds on the east coast of Ireland. Dalton, in his 'History of Ireland' (1838), says, "The Cornish Chough, *Corvus graculus*, with red bill and shanks, is frequently seen here; also the Rock Pigeon, *Columba rupicola*." In 1851 Thompson, in his 'Natural History of Ireland' (vol. iii., p. 368), remarked:—"The species reported to me (by Mr. R. R. Montgomery) as breeding at the cliffs of the island of Lambay, off the Dublin coast, in 1850, were Puffins, Razorbills, Common and Black Guillemots, Common and Green Cormorants, Greater and Lesser Black-backed Gulls, Herring Gulls, Kittiwakes, and Manx Shearwaters. In 1849 the Lesser Black-backed Gull was not observed there, and of the Greater there were three pairs; Herring Gulls and Kittiwakes were very numerous. The

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* A 'Flora of Lambay,' by the writer of the present paper, is now in the press of the Royal Irish Academy.

Raven's nest was thrice robbed of six eggs, and four of the Shearwaters were taken from the holes in which their nests were placed and wantonly destroyed by boys." In 1853 Watters, in his 'Natural History of the Birds of Ireland' (p. 267), added to this list of birds the Common Gull, and remarked further, that—"Amongst the land-birds which frequent the same (eastern) face of the rocks we find the Peregrine (rarely of late years), the Kestrel, Raven, Hooded Crow, Jackdaw, and Stare (the Chough is also said to nidify in rare instances), the Wheatear, Window Martin, Swift, and Rock Pigeon."

Since the year 1870 I have frequently visited Lambay in the breeding-season, and during the last four or five years I have gone there regularly to botanize and watch the birds, staying upon two occasions for several days, being indebted for my accommodation upon the island to Mr. Dillon, the courteous agent of Lord Talbot de Malahide. The above statements about the Lambay birds are still substantially correct, but time has produced alterations, and, in addition to a fuller account, I have ventured to insert some observations about the range of the rarer species on the east side of Ireland generally. With the winter visitants I am not dealing. Lambay is probably visited as a halting-place by most of the winter migrants, but there are no sloblands or salt-marshes of any extent to attract coast-feeders, so that a visit at that season would be most unlikely to repay the trouble.

Lambay is not very readily visited, and there is no public accommodation; moreover, the island is most happily preserved as a rabbit-warren, so that the birds are but slightly molested.

White-tailed Eagle, *Haliætus albicilla*, Gmelin.—Had an eyrie on Lambay during the last century (Watters), but now seems to have entirely deserted the east side of Ireland. I have been continually amongst the Wicklow mountains for the past fifteen or twenty years, and cannot be positive that I have ever met with any Eagles there. In 1879 an Eagle was seen on Kippure, feeding on a hare, by George Barker, wood-ranger. He believed it was a Golden Eagle. This is the latest instance I am aware of. A caretaker on Lough Bray, who has known the mountains there for about sixty years, gave me some definite information:—"About fifty years ago (*circa* 1832) I got to look at an Eagle's nest in the cliffs above the upper lake. Up to that time they had always bred there. It was the 'Grey Eagle.' Round the nest were numerous remains of hares, grouse, and lambs. It was very large. That year, or the next, some gentlemen came and got the eggs, and the birds never came back, nor did he ever hear of their being on those mountains since." Lough Bray is in the mountain border between Wicklow and Dublin. Eagles have, no doubt, formerly bred on Lugnaguilia, but I have never seen one there. With reference to the name "Grey Eagle," Macgillivray, speaking of the White-tailed Eagle, says:—"In the Hebrides and Highlands the old bird is named an *Iolair ghlas*, the grey eagle, and the young an *Iolair riamhach*, the striped eagle."

PEREGRINE FALCON, *Falco peregrinus*, Gmelin.—Called the "Main-hawk" at Lambay, where it breeds regularly. In 1881 two pairs reared their young, one of which we captured. This nest was about a hundred feet above sea-level, on the cliff south of the Pilot's Hill, on the east side of the island. A cousin of mine, whom we lowered with a rope, described it as being full of Puffins' heads. The brood was three, two of which escaped. This was on June 14th, and a week later a second pair brought away their young at the Seal Hole, about half a mile south, where they bred again the following year. In 1882 two eggs were taken and a young bird left, which had not quitted the nest at the end of May. In previous years they bred sometimes here and sometimes upon Ireland's Eye, six miles south, which they seem to have finally forsaken. Their nest is large and flat, of twigs and grass, lined with hair, wool, or fine weeds. The young are covered for about a fortnight with a thick white down. The eggs frequently are only three in number. Here, as in Donegal (where I have observed nine distinct breeding-places), the nest is found in the closest proximity with Razorbills and other sea-fowl, and this is the more remarkable since the Falcon selects his site and commences to breed before his neighbours do, who fearlessly swarm around the bird who preys upon them. However, the Puffin seems to be his favourite food, and I do not find him on such closely familiar terms. It is probably only for convenience sake and as a quick supply for their young that the Falcon feeds on these birds; game, especially Grouse, seem to be their favourite food. There is no difficulty in finding the home of the Peregrine. When the visitor approaches their cliff in the breeding-season, as soon as the birds' suspicions are aroused, the male starts out screaming, and flies around at a distance of one or two hundred yards, with a harsh and incessant cry. As long as the intruder remains this is continued, and if the mate be disturbed from the nest both birds keep up the concert. The nest is invariably inaccessible without the aid of a rope. The parents remain about the breeding haunt till late in the summer. The young are slow in arriving at maturity; they are usually able to fly about the middle of June. On the east of Ireland I have met the Peregrine on the Mourne Mountain, and on the Antrim coast in two or three places to the northward; while south of Lambay it bred at Luggela, in Wicklow, in 1882, and previously. The cliffs above Lough Nahanagan, in the same county, were—till recently, at any rate—inhabited by these birds, and I have seen them also at Lough Bray, but they have become very scarce in this county. There is no suitable habitat along the coast till we round Carnsore, excepting Bray Head, in Wicklow, where they formerly bred. After Carnsore I saw Peregrines, in 1882, at the Saltee Island, at cliffs near Fethard, and at Ardmore Head. As a rule they prefer sea-cliffs, but I met with them the same year breeding in the Twelve Bens, in the County Galway.

KESTREL, *Falco tinnunculus*, Linn.—A pair or more usually breed on the north side of the island.

SONG THRUSH, *Turdus musicus*, Linn.—Usually a couple of pairs breed. Thrushes have been scarcer on the island since the hard winter of 1880; they appear to be summer visitors.

BLACKBIRD, *T. merula*, Linn.—A few inhabit and breed on the island.

HEDGESPARROW, *Accentor modularis*, Linn., and REDBREAST, *Erythacus rubecula*, Linn. — Breeding and residing in small numbers.

STONECHAT, *Saxicola rubicola*, Linn.—Two or three pairs breed. Probably migrant.

WHEATEAR, *S. œnanthe*, Linn.—A summer visitor; several pairs breed amongst the rabbit-holes.

WHITETHROAT, *Sylvia rufa*, Bodd.—Lambay is quite a favourite summer haunt of this cheerful songster, the dense tangles of bramble there being well adapted for breeding quarters.

WILLOW WREN, *Phylloscopus trochilus*, Linn.—One or two pairs were breeding in the neighbourhood of the castle, 1882. A rare summer visitor to Lambay.

WREN, *Troglodytes parvula*, Koch.—Frequent.

PIED WAGTAIL, *Motacilla lugubris*, Temm.—Formerly not infrequent, but scarce since the hard winter. A pair reared a brood in 1882.

MEADOW PIPIT, *Anthus pratensis*, Linn.—Common.

ROCK PIPIT, *A. obscurus*, Lath.—A few pairs breed.

BUNTING, *Emberiza miliaria*, Linn.—One pair at least bred in 1882, at the south-western corner of the island. The species is frequent on the neighbouring mainland.

YELLOWHAMMER, *E. citrinella*, Linn.—Breeds sparingly; more numerous before the hard winter.

CHAFFINCH, *Fringilla cœlebs*, Linn.—A few breed about the castle.

GREENFINCH, *Coccothraustes chloris*, Linn.—Several breed about the castle.

LINNET, *Linota cannabina*, Linn.—Not uncommon; large flocks visit the island; with them are also hen Chaffinches and Sparrows.

TWITE, *L. flavirostris*, Linn.—I saw a pair of these birds in September, 1881.

SPARROW, *Passer montanus*, Linn.—Frequent, but chiefly observed as an autumn visitor.

STARLING, *Sturnus vulgaris*, Linn.—Flocks arrive in September. Some breed on the cliffs at the north-west corner of the island.

RAVEN, *Corvus corax*, Linn.—The Raven breeds annually at Lambay. Although laying five or six eggs it frequently rears only two or three young ones. On September 9th, 1881, I was staying at Lambay, and had seen the parent birds the two previous days. On this day two young made their appearance, and for the chief part of that day the island resounded with croakings, screamings, and the din of war. Wherever the young set foot the old birds flew past, buffeting them with their wings and pursuing them in the air. They continued thus to harass them until the unfortunate progeny left the island, when peace was restored. This expulsion of the young occurs annually, but the latter are seldom, as in this case, foolhardy enough to return. Last year I watched a similar proceeding on one of the Twelve Bens in Connemara, where the mountain was evidently not considered wide enough for more than a pair. Occasionally Ravens have bred at Ireland's Eye, near Lambay. In September, 1881, I climbed to the summit of a tabular-topped pinnacle at the north-eastern end of this island—a difficult feat, which the Ravens resented as an unwarrantable intrusion. This is probably a favourite roosting-place, and they have bred on the cliffs below. The Raven and the Peregrine are very jealous neighbours, and are continually having battles on the border-ground of their domains. In Donegal I have frequently seen one drive the other away when trespassing. It is not usual to find them side by side as at Lambay, yet I know a small isolated mountain in Galway where both species breed in close proximity, with only the summit between them, the Raven, as it should be, on the northern side, and the Peregrine to the south. At Howth Ravens have reared their young several times between 1870 and 1880; four were taken about 1872 by my cousin, Mr. M'Dougall, who showed me their nest of 1878. A pair used frequently to be seen about the Baily Lighthouse, but within the last few years they are perhaps deserting Howth for Lambay. In Co. Wicklow they still cling to their old breeding-haunt at Lough Bray, and though often banished, they are usually to be met with about Lugnaguilia. They have been destroyed in places in this county by letting down "flams" to their nest and burning them out. It is believed they attack lambs and tear out their eyes, but a herd who has lived in their neighbourhood for sixty years "never knew them to meddle with lambs, unless dead." The Raven breeds very early; I have seen the young flying strong in the second week of May. It is said to breed on the Saltee Island, but I saw none there this year. It is not infrequent in the mountainous districts of the west and north of Ireland.

Hooded Crow, *C. cornix*, Linn.—Is included by Watters amongst the birds breeding on the rocks at Lambay, but it has not done so recently, and is now rarely, if ever, seen in this part of Ireland.

Rook, *C. frugilegus*, Linn.—Is of frequent occurrence.

Jackdaw, *C. monedula*, Linn.—Breeds on the cliffs on the northern side.

Cuckoo, *Cuculus canorus*, Linn.—A summer visitor. One or two usually remain a short time, perhaps long enough to deposit their eggs and leave.

Nightjar, *Caprimulgus europæus*, Linn.—I saw a Nightjar on Lambay in May, 1882. A pair or two usually breed on Howth, and it is not unlikely that they occasionally visit Lambay for the same purpose.

Wood Pigeon, *Columba palumbus*, Linn.—Is frequent in autumn and spring, but I have no evidence of its breeding on the island.

Rock Pigeon, *C. livia*, Temm.—Formerly bred on Howth and Lambay, but no longer a resident. I have only seen Rock Pigeons once on Lambay, namely, in September, 1881, in Saltpan Bay, where I saw six together; they did not, however, return to breed in 1882. Four were seen (and I believe shot) on Howth in the spring of 1880. From the Saltees and Hook Head westward the Rock Pigeon becomes frequent. From Lambay to the Saltees there is hardly any suitable head-quarters for rock-birds till we round the south-western corner at Carnsore.

Lapwing, *Vanellus cristatus*, Meyer.—Two or three pairs were breeding in May, 1882, as they do annually. They are known as the "Phillipene."

Oystercatcher, *Hæmatopus ostralegus*, Linn.—I have seen these birds on Lambay several times during the breeding season, and am assured they have nests there, but I have not succeeded in finding them.

Corn Crake, *Crex pratensis*, Bechst.—Heard at the end of May, 1882, and was informed that it breeds annually on the island.

Puffin, *Fratercula arctica*, Linn.—Breeds in some numbers, perhaps thirty or forty pairs, chiefly on the east side of the island. The single egg is usually laid in a hole a foot or two from the surface on steep banks above the rocky part of the coast, but I have sometimes found it at the entrance. They arrive at the end of April, commence to lay in the second or third week of June, and leave the island about the first week of August. A pair or two breed on Irelands Eye. The largest colony of Puffins I know is that on Saltee Island, Co. Wexford.

Razorbill, *Alca torda*, Linn.—Is much more numerous than the last species, and lays about a fortnight earlier. It breeds on all sides of the island, except the western, but chiefly abounds on the eastern cliffs. These birds choose ledges of rock for their eggs, usually higher up than the Guillemot, but both may often be seen together. Next to the Kittiwake this is perhaps the commonest bird on the Lambay cliffs.

GUILLEMOT, *Uria troile*, Linn.—Breeds at the same time as the last-named species, and chiefly upon the north side of the island, nearer the water. There is a horizontal fissure in the cliffs west of Freshwater Bay, at a place called "New House," where these birds especially abound. This fissure is about thirty-five feet above the water, and twenty or thirty feet in length. It is deep enough to permit one to wriggle along the floor, which is covered with Guillemots' eggs, and I have twice succeeded in climbing into it, in the hope of obtaining a Shag's egg. This is the chief home of the Guillemot on the island.

BLACK GUILLEMOT, *Uria grylle*, Linn.—I have seen a pair or two of these birds on the water within a mile or two of Lambay in summer, but it appears to have entirely forsaken the island as a breeding-place. Watters, writing in 1853, estimated that between one hundred and one hundred and fifty of these birds annually incubated there at that time. This number is probably much exaggerated. Mr. R. J. Montgomery wrote to Thompson, after visiting Lambay in June, 1849, that he was unable to find their eggs, though breeding on the south side of the island. Thompson himself saw several there on June 5th, 1838. My own experience leads me to believe that this bird does not usually assemble in large numbers to breed. On the Donegal cliffs I have only seen them in companies of a dozen or two about their time of incubation. A couple of pairs still breed on Ireland's Eye, and I have reason to believe on Howth also.

CORMORANT, *Phalacrocorax carbo*, Linn.—Breeds sparingly on the north side of the island, the young being usually flown by the end of May. Formerly they bred here in much greater numbers, but their nests being easily pilfered they have been much reduced. The nests are in close proximity. On Breaghy Head, in Donegal, in a space of about fifty square yards I have noticed nearly as many nests, the young being mostly flown on May 26th: at this period the female bird will not leave her eggs till almost touched, uttering at the same time a peculiarly deep hoarse note of alarm. The nests are large and loosely constructed, and usually, but not always, built on the clayey margin near the summit of the cliffs. A pair or two of Cormorants may possibly still breed on Howth, but the presence of these birds during the breeding season, like some of the Gulls, Sandpipers, and the Gannet, is no evidence of their having nests in the neighbourhood.

Shag, *P. cristatus*, Fab.—A very few pairs still breed, but this species is very scarce on Lambay. I was informed that not more than four or five pairs were there in 1882. These are scattered over the island, and the only site I am sure of is in a cave near the New House. Both species of Cormorant inhabit this cave, but the larger chiefly frequent Carnoon and Saltpan Bay, on the north-west of the island. A pair or two of Shags breed, I believe, also on the south side of the island, but my visits have in general been late for these birds. On Horn Head and the Sheephaven cliffs, in Donegal, I have found the greatest difficulty in obtaining the eggs of the Shag. Their favourite place is near the roof of a cave from the entrance to a considerable distance in, where the overhanging nature of the situation, as well as its moistness and slipperiness, renders climbing most dangerous. The Gap of Doonmore, on Horn Head, the finest cave I have seen, is inhabited by both the Cormorant and Shag. Here I succeeded in climbing to their nests at the end of May, when the majority of the eggs were hatched. A peculiarity about these birds which I have not seen mentioned is that eggs and young birds in widely different stages of incubation may be found in the same nest. In one nest of the Shag I found an egg nearly fresh, a young bird just hatched, and another apparently about a week old. The eggs of both species are very variable in size, especially those of the Cormorant, which are sometimes not bigger than those of the Shag.

Kittiwake, *Rissa tridactyla*, Linn.—Breeds in great numbers from near the water's edge to about three-fourths of the way up the cliffs on all sides of the island except the lower western shore. It makes a small, compact, and comfortable nest, which it sometimes affixes to the sheer face of a cliff (as at the New House), with hardly a prominence to commence upon. I have usually observed three eggs in each nest, and these are laid early in June. The Kittiwake is much the most abundant bird on Lambay, and breeds sparingly on Ireland's Eye.

Greater Black-backed Gull, *Larus marinus*, Linn.—Used formerly to breed on Lambay, as stated in my introductory remarks, but I have never seen this bird there, and it is scarcer along the Dublin shore than formerly. The nearest breeding-place of this Gull, I believe, is at the Saltee Islands, but for this, however, I cannot personally vouch.

Lesser Black-backed Gull, *L. fuscus*, Linn.—Is nearly, if not quite, banished from the island as a breeding bird. I have seen a pair or two in different years, but have never found their nests.

Herring Gull, *L. argentatus*, Linn.—Breeds in some numbers, perhaps about fifty or sixty pairs. The nests are usually placed on shelving rocks, where they slope from a tolerable height to the water. From this circumstance they are easy of access and often robbed; hence the birds are diminishing in numbers. From Howth and Ireland's Eye they have been very nearly banished. On the south side of Lambay they have a haunt of their own. In other parts of the island they breed alongside of the other sea-fowl. The eggs are usually three in number and laid in the beginning of May.

Common Gull, *L. canus*, Linn.—Is included in Watters' list of birds breeding on Lambay; he states, however, that only a few pairs nest there. Thompson does not mention it, and I have never seen it on the island. It seldom selects a maritime breeding station.

Manx Shearwater, *Puffinus anglorum*, has long been known to breed on Lambay Island, though I am not aware that the eggs have ever been brought thence. As my observations on this bird at Lambay have already been published, in connection with remarks on its singular note (p. 81), it will be unnecessary to repeat them here.

[In reference to the Ornithology of the Dublin coast, attention may be directed to articles by Mr. Blake-Knox in earlier volumes of 'The Zoologist' (1865—1869), entitled "Ornithological Notes from the Co. Dublin," and to his account of "The Migratory and Wandering Birds of Co. Dublin" (Zool. 1866, pp. 220, 309); as also Mr. H. L. Cox's articles on the "Birds of Dublin and Wicklow" (Zool. 1879, pp. 449, 477).—Ed.]

ORNITHOLOGICAL NOTES FROM DEVON AND CORNWALL.

By John Gatcombe.

On looking over my notes for September last I found that I omitted to mention the occurrence of several Turnstones and Oystercatchers, which were brought in to our birdstuffers during that month. The Turnstones had nearly completed their autumnal moult, showing a fair amount of ferruginous-brown on their backs and scapulars; their breasts, too, were fairly black. The stomachs of the Turnstones I found quite empty, but those of the Oystercatchers contained remains of limpets and fragments of their shells.

On November 4th I examined a Short-eared Owl and a Kestrel which had been brought to a Stonehouse birdstuffer. The stomachs of both contained a quantity of mouse-fur, and that of the Kestrel a very large beetle-grub.

On November 9th, the wind blowing strong from the N.N.W., I observed a Northern Diver off the Devil's Point, Stonehouse, and an immature Black Redstart on the rocks in the same locality. By the 11th some Black Redstarts were to be seen on the cliffs near the Plymouth citadel. I examined the stomach of a Tawny Owl, and found in it nothing but a caterpillar of the cabbage moth, *Mamestra brassicæ*. The Northern Diver, I am sorry to say, was killed and brought in to a local birdstuffer. Its stomach was crammed with the remains of small swimming crabs, mixed with a few stones, and its gullet contained a few prawns. Another was obtained on the 23rd, making the sixth brought in during this month.

On November 13th, wind blowing very hard from the N.E., a male Black Redstart on the rocks near the citadel showed a white patch on the wings, but little black on the breast. There were two immature Red-breasted Mergansers in the Devonport market. On the 23rd I examined a Little Bustard which had been sent up from Trevone, near Padstow, Cornwall. It was a bird of the year, and its stomach contained a large mass of turnip-leaf, unmixed with gravel or stones. The last Cornish specimen mentioned by the late Mr. Rodd, on the authority of Mr. Stephen Clogg, was killed in the parish of St. Martin, near Looe, on January 9th, 1875.

On December 7th, wind N.N.E., snow having fallen during the previous night and early morning, flocks of Sky Larks and Redwings were seen continually passing over from east to north-west until dark. In the markets were numbers of Wigeon, Teal, a few Golden-eyes, and one young White-fronted Goose. Redshanks were also to be seen, and many Herons and Kingfishers found their way to the birdstuffers' shops. I have often remarked that the two last-mentioned species suffer much during severe cold. During this month I met with an unusual variety of the Oystercatcher, having a narrow white streak or band running from the base of the under mandible down the throat and joining the collar on the neck. In the stomach of this bird were small mussels and a piece of slate.

Many Great Black-backed Gulls made their appearance about this date in our harbours, which they generally do about Christmas. On the 28th there was a Turnstone and Dipper in the market,—the latest date for the Turnstone I have ever noted in this locality,—also a Greenshank which had nearly attained its full winter plumage, the general tint of which, on the upper parts, was a very pale and pleasing grey.

On January 15th there were numbers of Razorbills in small parties, on the water and on the wing, flying swiftly about in every direction—a sight seldom witnessed in the harbour or Sound. There were also some more Northern Divers on the coast. On the 16th a Black Guillemot, *Uria grylle*, in weather-worn winter plumage, was brought in to be preserved, but I could not ascertain exactly where it was shot. It is a bird rarely met with in this locality, and the last I saw was brought from Falmouth, and had been killed by a friend of mine in that harbour. The stomach of the present specimen contained nothing but shrimps or young prawns. About this date I examined another young Red-breasted Merganser, a Great Spotted Woodpecker, and a variety of the Starling in very light brown or drab-coloured plumage, all the spots and markings appearing as if nearly washed out. This variety, I think, is not uncommon.

On the morning of January 25th an immature Iceland Gull made its appearance in the harbour after a very strong wind from the S.S.E., which by the 26th had increased to a heavy gale to the north-west, with hail and snow. Razorbills were flying about like wildfowl.

Frost set in during the night of February 1st, changing by the morning to a strong south-east gale. I observed a Northern Diver and several Razorbills, together with a few Guillemots and a great number of Kittiwakes, which latter had become very plentiful after the recent gales; and by the 11th I remarked that many Shags had assumed fine crests, with the yellow-spotted gular pouch, and were apparently in full nuptial dress.

On the morning of the 14th, after a tremendous storm during the previous night, some fine old Cormorants, with hoary necks, fine crests, and oval white spot on thighs, were seen constantly diving, and bringing up such large fish as seemed almost impossible for them to swallow, but which with much apparent difficulty they at length managed to get down. The struggles, twistings, and turnings of these big fish in the distended gullet of the half-choked Cormorant actually gave them the appearance of going down at the back of the neck. The following day I saw one of these birds, which had alighted perfectly exhausted on a heap of stones on the quay of the Great Western Docks. It had an immense Mullet in its throat, which I was told it could neither get up nor down, allowing itself to be captured with the greatest ease. The fish, however, was at length disgorged, but the poor bird did not long survive.

About this time a Common Guillemot, in perfect breeding plumage, was knocked down by a boatman with a paddle, and a fine Gannet was shot on the rocks of Drake's Island in the Sound. Gannets are seldom seen so near the harbour.

On February 18th, wind north, I saw another Black Redstart. A Shag, with very fine crest and beautiful bottle-green plumage, had just been killed; and by the 25th, a very fine day, the Herring Gulls were uttering their spring or breeding cry, and many of the Black-headed Gulls had assumed tolerably dark heads. About this date flocks of Greenfinches appeared on the coast.

My friend Mr. Thomas Wolferstan, informs me that not long since his brother shot a Partridge, which on being brought to table was found to have been wounded at some time, by a large piece of wood which had entered the chest and pierced the breastbone, where it broke short off and still remained, the flesh-wound being so perfectly healed as not to be perceived. The bird seemed to have entirely recovered, and was in first-rate condition.

NOTES AND QUERIES.

The Preservation of Epping Forest.—Naturalists, especially those living in and around London, will rejoice at the collapse of the Great Eastern Railway Company's scheme in regard to Epping Forest. The Directors of this Company, ignoring the Epping Forest Act, 1878, and ignoring also the fact of there being already thirteen railway-stations in proximity to the Forest, not one of which is distant from it more than two miles, have been for some time endeavouring to persuade the public that another station is needed, and in a Bill introduced into Parliament for an extension of their line, calmly proposed to cut through the Forest in a direction from Chingford to High Beech, erecting an unsightly viaduct by the way, and an equally objectionable public-house at the terminus, in one of the most beautiful parts of the Forest. The most extraordinary circumstance in connection with this scheme is that the Directors of the Company not only ignored entirely the provisions of the Epping Forest Act of 1878, but actually persuaded the Conservators of the Forest, appointed under that Act, to do the same! The 7th section of this Act provides that "the Conservators shall at all times keep Epping Forest uninclosed and unbuilt on, as an open space for the recreation and enjoyment of the public: and they shall by all lawful means prevent, resist, and abate all future inclosures, encroachments, and buildings, and all attempts to inclose, encroach, or build on any part thereof, or to appropriate or use the same, or the soil, timber, or roads thereof, or any part thereof, for any purpose inconsistent with the objects of this Act." Further that "the Conservators shall not sell, demise, or otherwise alienate any part of the Forest, or concur in any sale, demise, or other alienation thereof or of any part thereof," and that "the Conservators shall at all times, as far as possible, preserve the natural aspect of the Forest." The duties of the Conservators are therefore perfectly clear, and it is inconceivable that they should have so far ignored the very object which the Legislature had in appointing them as to give their consent in the way they did to the Railway Company's scheme. The adoption of such a course can only be explained on the assumption that the probable development and improvement in value of properties adjacent to the proposed new line, and belonging to the Conservators or some of them, caused them to think more of private interest than of public trust. Fortunately for those who regard the Forest, or what is left of it, in a true light, and appreciate the boon which was conferred on the public by the Act of 1878, there were not wanting champions to do battle with the Company, and to recall the Conservators to a sense of duty. Foremost amongst those who came forward in this behalf were the members of "The Essex Naturalists' Field Club," who by means of deputations to the county members, Sir Selwyn Ibbetson and Lord Eustace Cecil, Sir John Lubbock, and others, took care to have the true facts of the case laid before Parliament before the day came for the second reading of the Bill. Indeed it may be said with truth that the rejection of the Bill, which was eventually thrown out by a majority of 230 members against 82, was in a great measure due to the energetic steps taken with that view by the indefatigable Secretary of that Society Mr. William Cole, by the President Professor Boulger, and by the ex-President Mr. Raphael Meldola. To these gentlemen, especially, are the thanks of naturalists due for having come forward in the way they did to uphold the preservation of the Forest according to the letter and spirit of the Act by which it was declared to be the property of the public, and to prevent the abstraction of any part of it for private purposes. Epping Forest is one of the very few remnants of primæval woodland now existing in England, and has for nearly a century been the resort of that class of Londoners who take the purest delight in a ramble in free air in search of natural objects and phenomena. It is a significant fact that the petitions presented by the Essex Naturalists' Field Club bore signatures representing nearly 4000 amateur naturalists of London, who consider the railway accommodation now available to be more than sufficient for their requirements, and resent the threatened invasion and destruction of their recreation ground, as well as any further curtailment of its area. Now that the House of Commons has so emphatically pronounced against the Bill in question it is to be hoped that we shall hear no more of any such barefaced attempts at annexation and spoliation.

Notes from the Solomon Islands.—We reached Ugi, one of the easternmost islands of the Solomon group, on the 9th November, and left again on the 12th, visiting Florida and Guadalcanar on our way to the Duke of York Island. The Solomon Islands are of course a good deal more tropical in their appearance than the New Hebrides. It appears to be constantly raining, so that all the under vegetation is very dense, and everything reeks with vapour. We were fortunate while we were at Ugi, as it only rained the afternoon of the day we left. I went on shore every day we were there, but on the whole was disappointed with what I got. Butterflies were very scarce, and a large proportion of those I obtained were more or less worn. I got about 140 good specimens, most of them being new to me. Of course I saw a great many I was unable to catch. Many of them flew among the highest branches of the loftiest forest trees, so that it would take some time to get at these species. There were five or six fine Papilios about, and one I captured about 5¾ in. across the wings. As there were no roads of any kind, my hunting was confined to narrow native paths, where it was difficult to catch butterflies as they crossed; and if missed they went away at once into the forest, where it was impossible to follow them. Small birds were very scarce, but the trees above one were well stocked with cockatoos, parrots, and pigeons of various kinds. These were all extremely difficult to see, although one could hear them in dozens overhead. One of our fellows shot several about the size of our common wood-pigeon, but they were dry eating. From the ship I often saw big white cockatoos flying above the trees, and their white plumage looked very conspicuous against the deep green of the forest. Their flight is slow and flapping, and they keep up a continual shrieking all the time. One day we started early, a party of five of us, with two natives for guides, and walked a few miles inland to visit a native village. The path led us through the densest forest, and we had to walk in single file. In some places the trees were so thick overhead that the path below was in perfect gloom. Some places we passed through would have been fine spots for the natives to have attacked us; however, they are all friendly in this island. The ferns were in the greatest abundance, and many of them were extremely beautiful, as were also the palms, which were in great variety. As we neared the native village the path became more open, and upon reaching it there was a little cleared ground in the immediate vicinity, and here I managed to catch five or six dozen butterflies, several new species among them. The natives living in the village seemed pleased to see us. Their houses are better built than those of the inhabitants of the New Hebrides, and the men themselves are a finer race. We got them to boil us some water and to cook some yams, and a pigeon we had shot on the way. I had brought a bottle of claret, with some cheese and biscuits, so we had our lunch in the middle of the village with an admiring group of natives looking on. We obtained by barter a few curios in the way of spears, clubs, &c., things hard to be got now-a-days when there are so many labour vessels about, from which the natives procure rifles and hatchets, and have no longer need to make spears or clubs. We left the village about 2 p.m., and got on board at 4.30. These savages might easily have killed and eaten us had they felt inclined to do so, but they seemed to be quite peaceable. Very few of the fair sex were to be seen, and those that put in an appearance were abominably ugly, and some of them had tame flying-foxes clinging to their hair, scarcely pleasant pets one would fancy. Dec. 11, 1882.—We are now steaming towards the anchorage at Brisbane; and since writing the above we have been to Duke of York Island, and Cooktown in the north of Queensland, only staying a very short time at either place, so that I had not much chance of doing anything. At Meoko, Duke of York Island, it rained most of the time we were there, but I had one day, and managed to catch a few new butterflies, and again was disappointed in the scarcity of species and specimens. I was, however, delighted at capturing examples of a magnificent Ornithoptera, a butterfly nine inches across the wings! and, moreover, was lucky enough to find its larva, and at the present moment have a fine healthy chrysalis, which I am in hopes of breeding. It is about ten times as big as that of *P. machaon!* At Cooktown I was glad to take about 13 fresh species of Australian butterflies, and if we had only remained there a few days longer I might have doubled the number. From Cooktown here (about 1100 miles) we steamed inside the great barrier reef and close to the mainland, often passing through groups of lovely islands, and occasionally anchoring alongside one of them for the night. One afternoon, towards four o'clock, I noticed flocks of strange birds passing the ship, and making for some thickly-wooded islands ahead of us. They kept a long way from the ship, and I was at a loss to make out what they were. At one time I thought they were wildfowl of some kind. They were white with black wing-feathers and white black-tipped tails. They flew with their necks stretched out, but not fast enough for wildfowl. Then I fancied they might be plovers, but they seemed too big, and did not flap their wings sufficiently. At last a flock came within nearer range, and I discovered, to my astonishment, that they were pigeons, and, as we neared the islands, there they were in thousands upon thousands settling on the trees. By the time we anchored it was six o'clock, and there was only half an hour's daylight left, and, with one of my messmates, away I went to try for a shot. At the first report of our guns what a sight met our eyes! A living stream of these birds rushed from every tree and bush upon these three islands and wheeled about overhead, every moment some of them descending to pitch again. The trees were high up on the island, and as the birds flew out they were regular rocketers and nearly out of shot. I landed on a sand-spit, while the other fellow pulled round to the opposite side of the island, and fired away a lot of cartridges at the birds as they whistled through the gloom high above me, but unless the birds fell on the little sand-spit they were lost, for the bush was so thick it was impossible to find them; indeed, I never thought of looking. I bagged three brace, and my friend when he returned had a brace, and a small reef heron. If we could have had a couple of hours of daylight we might have shot hundreds. They were fine and plump birds, as large as our English Ring Dove, creamy white, with primaries, secondaries, and tertiaries of the wings smoky-black, and tail-feathers tipped with black. I skinned a couple of them the next day. They are the white nutmeg pigeon of Gould (*Myristicivora spilorrhoa* of G. R. Gray).—*Extract from letter of* G. F. MATHEW, R.N., F.L.S. *Communicated by Rev. M. A. Mathew.*

Vermin destroyed on an Irish Estate.—By permission of Mr. Smyth, of Headborough, I give from his carefully-kept register a table of "vermin" which were trapped, poisoned, or otherwise destroyed during twelve years that he preserved his own and some adjoining properties, extending over about three miles square, to the south of the River Bride, near its confluence with the Blackwater, both large tidal rivers. Game preservation being but little practised in this county, fresh Hooded Crows, Magpies, &c., must have continued to flock in, notwithstanding the destruction of their kindred. The smaller number of Kestrels destroyed is not to be taken as showing their comparative rarity, but being, as Mr. Smyth observed to me, far less bold than Sparrowhawks they less frequently fall victims to the keeper's gun or traps. The fact that no Long-eared Owls were killed after 1876 may be attributed to the fact that Dunmoon Wood, in the vicinity of "the mountain," which was their chief resort, was cut down about that time. Trapping was carried on only over an area of less than 1000 acres, containing much woodland, bounded on the north, east, and south by rivers and streams, and having a mountain district to the west, the population being very small. The number of Cats trapped within this area is very remarkable, as showing how prone these creatures must be to wander away, and take to a wild, marauding life.

Table showing the numbers of vermin destroyed at Headborough, Co. Waterford, during the twelve years ending 1879.

	Dog.	Cat.	Stoat.	Kestrel.	Sparrow-hawk.	Brown Owl.	Barn Owl.	Hooded Crow.	Magpie.
1868	9	22	18	6	15	5	1	26	59
1869	3	16	21	4	18	2	1	13	26
1870	3	24	20	-	19	3	2	22	49
1871	1	36	25	6	26	3	1	29	58
1872	2	31	48	5	26	6	-	26	28
1873	12	64	76	7	23	3	1	29	20
1874	7	49	39	6	24	4	-	29	32
1875	9	44	25	5	24	2	1	26	25
1876	9	49	47	6	24	4	-	27	27
1877	8	62	45	1	31	-	-	26	30
1878	5	70	51	-	14	-	-	14	21
1879	11	82	55	2	16	-	-	22	29
Total	79	549	470	48	260	32	7	280	404

In addition to these there were killed in 1872 a Raven, in 1876 a Hen Harrier, in 1877 two Peregrines and a Merlin, and in 1878 a Merlin and a Hen Harrier.—R. J. Ussher (Cappagh, Co. Waterford).

Asiatic Lepidoptera.—The publication is announced of the first part of 'The Butterflies of India, Burmah, and Ceylon,' by Major G. F. Marshall, R.E., and L. de Niceville. The illustrations, drawn by native artists, under the direction of Mr. Wood-Mason, have been accurately reproduced in chromo-lithography by Messrs. West, Newman & Co.

MAMMALIA.

Note on the Age of a Wild Rabbit.—A wild Rabbit which has been brought up by hand recently entered upon its eleventh year, having been captured on the line in February, 1873, by its present owner, a guard on the Caledonian Railroad, when only a few weeks old. This rabbit is a great tea-drinker, taking a "dish of tea," with sugar and milk, whenever any is brewed. Though partial to the kitchen-fender in damp weather, at other times it is much in the open air, and is perfectly healthy, being plump and showing no signs of senility.—H. A. Macpherson (Carlisle).

Homing Instinct in Bats.—In order to observe the flight of these animals in sunlight I captured three Pipistrelles in an old castle situate on Little Island in the River Suir, near Waterford. These I placed in a box, so as to exclude all light, and carrying them to the mainland, to a point distant about half-a-mile, I liberated them separately. Each of them, after making one or two circuits in the air, went off in a direct line for its home. There was a very bright sun at the time, and a strong wind blowing against them.—G. Gyles (Kilmurry House, Waterford).

The Serotine Bat in Essex.—Although the Bats found in the county of Essex have received in the past a fair share of attention at the hands of Yarrell, Doubleday, and Messrs. Joseph Clarke and Henry Laver, the occurrence of the Serotine, *Vespertilio serotinus*, has not hitherto been recorded, having perhaps been confounded with the Noctule. I am glad therefore to be able to state that Mrs. Joseph Smith, of Great Saling, has in her possession a specimen of this Bat which was shot more than twenty years ago in the garden at Pattiswick Hall, near Coggeshall. It is so shrunk through bad stuffing that it is useless for me to give its dimensions.—Robert Miller Christy (Saffron Walden).

The Pilot Whale in Devonshire.—After the severe gale at Sidmouth between the 11th and 14th February last a Pilot Whale, or Bottle-nose (*Globicephalus melas*, Trail), was found by some fishermen in a dead or dying state on the reef of rocks called Hook Ebb, one and a half mile east of Sidmouth. They towed it to Sidmouth on the 15th, and by means of ropes and two horses got it upon the beach at the east end of the town, where they enclosed it with sails and exhibited it to the public in the orthodox manner practised on these occasions. Price of admission, "What you like, sir!"—the takings being carefully deposited in a money-box placed in a conspicuous position on the top of the Whale, to be divided between the thirteen joint owners of the prize. A real godsend this Whale has been to the unfortunate fishermen, for hardly anything has been done in fishing for months, the weather has been so very stormy all the winter. I visited Sidmouth on the 20th February, and the Whale was still quite fresh. It was a female, 16 ft. 8 in. from tip of the snout to the notch of the tail. Girth at the thickest part of the body just in front of the dorsal fin, as near as I could measure it, about 9 ft. Width of the tail part of the body, near the root of the flukes, 2 ft. From tip to tip of the tail flukes, 4 ft. From snout to dorsal fin, 5 ft. Eye very small, 4 in. from angle of the mouth. Flippers very narrow and pointed, 3 ft. 9 in. in length. The weight was supposed to be about two and a half tons by the men who hauled it up on the beach. The inside of the mouth was covered with hard blunt tubercules like shagreen. The colour was deep black, with a heart-shaped mark on the throat of a light greyish white, continued in a streak along the belly to the vent. When cut up it yielded about half a ton of blubber, which in some places was 6 in. thick. My friend Mr. P. O. Hutchinson, of Sidmouth, who kindly assisted me in obtaining all information possible about the animal, was zealous enough to keep watch and ward over the bones, so that none might be lost, when the carcase was boiled down, and a member of the Committee of this Institution having generously furnished funds for purchasing them, I hope to get the skeleton put together. The scapulars are extremely thin in the centre, and of very soft spongy bone. They are curiously corrugated across the blade. There are fifty-eight vertebræ (two or three more than stated by Bell and Gray), the last caudal being very small. All the cervical vertebræ are anchylosed together, the centre of the two last only being free. The teeth are $\frac{10}{10}-\frac{10}{10}$, and extremely deciduous, the alveoli being very shallow, and filled with a dark-coloured spongy substance. The basi-thyrohyal bone of the tongue is very large for the size of the animal. The figure given in the second edition of Bell's 'British Quadrupeds' is not good, as it fails to show the remarkably broad, compressed form of the hinder portion of the body or tail, and the flukes are badly drawn. The dorsal fin is very different in the figure from the natural form. The only recorded occurrence of this species on the Devonshire coast that I have met with is the one mentioned by Bellamy (Nat. Hist. South Devon, p. 196) as having been captured off Plymouth, April, 1839. The following are the measurements of the skull of the Sidmouth specimen:—Total length of skull, $28\frac{3}{4}$ in.; length from snout to blow-hole, 17 in.; length of teeth-series, 6 in.; length of lower jaw, $19\frac{1}{2}$ in.: width at notch, 9 in.; width at orbit, 16 in.; width of intermaxillary, $6\frac{1}{2}$ in.; width at middle of snout, 8 in.; height at occiput, 12 in.—W. S. M. D'Urban (Albert Memorial Museum, Exeter).

BIRDS.

Hybrid between the Lesser Black-back and Herring Gulls.—The hybrid between these two gulls mentioned by me at p. 450 of 'The Zoologist' for 1881 as having been bred in my pond in May, 1880, and allowed to fly, has from that time to the present paid me frequent visits, sometimes staying for two or three days together, sometimes leaving immediately after feeding-time, and sometimes not making its appearance for weeks together. It has now so nearly reached its adult plumage that I think it worth while to give a short description of it, as I have lately had a good many opportunities of looking at it, and am always afraid each visit may be its last, as it might meet with an accident on one of its journeys to and from the Bristol Channel, though as a rule it flies very high and quite out of shot. The wing-coverts and mantle appear now to have assumed their fully adult colouring, there being none of the brown markings of the immature plumage left. The quills, however, are not those of the adult bird, though I should think after another moult they, as well as the tail-feathers, which still have a few brown markings left, would be so. The wing-coverts and mantle are very pale indeed for a Black-back, though much too dark for a Herring Gull. The legs are flesh-colour like the Herring Gull, if anything a little brighter and more highly coloured, now showing no sign of the yellow of the Lesser Black-back. Any one shooting it and describing it might say it was a pale Lesser Black-back with the legs and feet coloured like those of a Herring Gull, but I do not think anyone would speak of it as a dark Herring Gull. The legs and feet are both the same colour, not like those mentioned at p. 70 of 'The Zoologist' for 1882 as one yellow and one pale flesh-colour. With regard to the remarks there made, I perfectly agree with my friend Mr. Howard Saunders that that bird is not a hybrid between *Larus fuscus* and *Larus marinus*. I believe these two gulls would never cross under any circumstances. But I do not go so far as to say, "I do not believe in hybrid gulls in a wild state," for I do believe that the Herring Gull and the Lesser Black-back would cross occasionally in a wild state, seeing the readiness with which they do so in captivity. I think an odd pair, a male of one and a female of the other, would breed without any difficulty, except, perhaps, the difficulty of finding a breeding-place where they would be free from persecution, for I do not think they would be allowed at a breeding station of either Herring Gulls or Lesser Black-backs. The bird above mentioned differs materially from *Larus affinis*, at least according to Mr. Dresser's description, for he describes *Larus affinis* as having the legs and feet yellow.—CECIL SMITH (Bishop's Lydeard, Taunton).

Singular Cause of Death of a Chaffinch.—The circumstances of a curious accident which a Robin met with, as recounted by Mr. Long (p. 123), have brought to my mind an instance of a somewhat similar nature which befel another small bird—namely, a Chaffinch—some years ago. On June 11th, 1877, whilst passing through the Sandburn Woods, a few miles from York, I picked up a dead male Chaffinch in breeding condition beneath a large fir tree. The cause of death seemed to be that it had got its left wing by some means over its neck, and had been unable to get it back. The neck passed between the eighth and ninth of the quill-feathers. However strange it may seem that a bird should meet with such an accident, I could come to no other conclusion than that just stated. The bird was unwounded, in good condition, with grit in its gizzard, and lay in a spot to which it was hardly likely to have been carried by human agency. It had been dead just too long to admit of preservation, but I have stuffed another bird in the position in which I found this one.—ROBERT MILLER CHRISTY (Saffron Walden).

Keble and the Nightingale.—Let me call attention to Keble's well-known lines on the Nightingale (in his verses for the first Sunday after the Epiphany), as illustrating the closeness and accuracy of his observation:—

> If, the quiet brooklet leaving,
> Up the stony vale I wind,
> Haply half in fancy grieving
> For the shades I leave behind,
> By the dusty wayside drear
> Nightingales with joyous cheer
> Sing, my sadness to reprove,
> Gladlier than in cultur'd grove.

Many readers of 'The Zoologist' who have heard the Nightingale singing from a dusty hedgerow by the side of a turnpike road "all day long," and have been struck by the strange preference of the bird for such a spot, will assent to the truth of these lines.—MURRAY A. MATHEW (Stonehall, Wolfscastle, Pembrokeshire).

Early Assumption of Breeding Plumage in the Cormorant.—A Cormorant was brought me on February 17th in the most perfect breeding plumage I have ever seen, the white patches on the thighs being peculiarly brilliant. This is nine days earlier than the date mentioned by Yarrell, who states that a Cormorant in the Zoological Gardens, Regent's Park, attained its greatest perfection of plumage by February 26th.—STEPHEN CLOGG (Looe). [See observations by Mr. Gatcombe, p. 167.—ED.]

Great Grey Shrike near Croydon.—The other day I obtained from Mr. Thorpe, of Southend, Croydon, a good skin of a Great Grey Shrike, caught by a birdcatcher at Croham Hurst, about two miles from here on November 18th, 1882.—PHILIP CROWLEY (Waddon House, Croydon).

Diver with the Tarsi feathered.—In a small collection of local birds exhibited by Mr. Gray, birdstuffer, at Dover, is a Red-throated Diver (*Colymbus septentrionalis*), with the anterior surface of both tarsi feathered throughout their whole length. The bird is, as mounted, a very small specimen.—ALFRED H. COCKS (Folkestone).

Pectoral Sandpiper in Dumbartonshire.—I have recently had an opportunity of inspecting a specimen of the American Pectoral Sandpiper, *Tringa maculata*, Vieillot, which was shot by Sir George Leith Buchanan on the 24th November last in the neighbourhood of his residence, Ross Priory, Alexandria, N.B. In a note which he addressed to the Editor of 'The Field,' published in that journal on the 2nd December last, referring to this bird, he says:—"It rose from some rushes, and I took it for a Jack Snipe until I picked it up. As it was blowing hard at the time, with snow and rain, I could not see distinctly." It is a rare straggler to the British Islands, and from the dates recorded of the few specimens which have been procured here (some sixteen in number) it would seem to have been almost invariably met with in autumn, generally in September and October. —J. E. Harting.

Singular Accident to a Bearded Tit.—Mr. Long's account (p. 123) of a Robin whose lower mandible became caught in the "skin of the neck and along the sternum" reminds me of a similar case which recently came within my experience. On visiting my aviary one morning about nine o'clock, I found a favourite Bearded Tit sitting in one corner of the cage, its neck arched, its chin tucked in, the upper mandible at right angles to the breast, and the lower one apparently gone. On catching the bird and examining it, I found that the lower mandible was, as described by Mr. Long, embedded in the skin of the breast. I at once extricated and straightened it as well as I could, for it was terribly bent. The bird on being released at once went to the water and drank freely, and in two or three days had quite recovered, its bill having returned to its normal shape. I must add that the bird's breast was completely saturated by saliva, the escape of which it was powerless to prevent.—John Young (Bayswater).

Montagu's Harrier in Ireland: Correction of Error.—At page 32 I communicated a note on a Harrier which has been preserved at Brittas since 1855 under the above name. Having recently obtained this bird through the kindness of Mrs. Dunne, and submitted it to Mr. A. G. More, I am informed by him that it is not *Circus cineraceus* but *C. cyaneus*. —R. J. Ussher (Cappagh, Co. Waterford).

Corn Crake in Winter.—On December 15th, 1882, I received from John Evans, of Bourne, a male specimen of *Crex pratensis*, which had been recently caught at Thurlby, near that town. This bird was much paler in appearance than usual, and very emaciated, although the stomach was full of snails (*Helix hispida*), which were whole, although the epidermis was destroyed by the fluids of the stomach. The humerus of the right wing evidently had been broken at some time and knit together again, but not in a straight line, the junction being about three-eighths of an inch from the fracture, and at an angle, thereby shortening the bone considerably, and no doubt greatly retarding the power of flight. If every case of hybernating Corn Crakes were carefully examined, we should probably find some malformation or injury fully accounting for the reason of not migrating, and that it is not from inclination that this species sometimes stays the winter, but simply from inability to leave the country.—R. M. Chase (Edgbaston, Birmingham).

Crested Lark breeding in England.—In the course of correspondence with Mr. Doggett, taxidermist, of Cambridge, who received in the flesh for preservation the specimen of the Short-toed Lark which was captured by a birdcatcher near Cambridge in November last, as already recorded (p. 33), he informed me that he then had in his possession alive an example of *Alauda cristata* which had been taken more than two years previously from a nest at Ibiston, near Cambridge. Some half-dozen instances of the occurrence of this bird in the British Islands have been noted since 1836, when one was obtained in Ireland: but no instance of its breeding here has hitherto been recorded, although the fact of its occasionally doing so may well have been overlooked from its similarity to the commoner *arvensis*. —J E. Harting.

Hybrid Song Birds.—Referring to my former note on this subject (p. 127), I may remark that hybrids between Linnet and Goldfinch, Linnet and Lesser Redpole, Linnet and Bullfinch, and Bullfinch and Goldfinch were exhibited in February last at the Crystal Palace Bird Show. Mr. Verrall, of Lewes, has also paired the Twite with the Greenfinch in his aviary, and a wild-bred hybrid between the Goldfinch and Greenfinch is now in West London. In referring to hybrids between Linnet and Greenfinch (p. 127), I forgot to allude to the hybrid of this description recorded in the first volume of Mr. Stevenson's 'Birds of Norfolk.'—H. A. Macpherson (Carlisle).

Notes from Gibraltar: Correction of Error.—In my Notes from Gibraltar (p. 100) there is an unfortunate transposition which alters the meaning of the first paragraph. It should read:—"Being at Gibraltar during the spring of 1882, I paid particular attention to the vernal migration, visiting Tangiers, an excellent place for observation, from 28th March to 5th April, again from 24th to 30th April, and from 25th to 30th May." —E. F. Beecher.

Great Grey Shrike in Suffolk.—Mr. J. E. Taylor, of the Ipswich Museum, in a note on this bird in the March number (p. 125), makes the misleading statement that "it is believed to be the only specimen killed here for many years past." Within the last few months I have seen one in the flesh and heard of another, both shot near here, and others have been obtained in years past in this neighbourhood.—Hugh Turner (Ipswich).

Dipper Singing during Frost.—The observations of the Rev. Murray A. Mathew and Mr. Ussher on the Dipper singing during severe frost are not new. Similar observations will be found in Thompson's 'Natural History of Ireland' (vol. i., p. 117) and in 'The Zoologist' (vol. ii., 1844, p. 450). In the 'Proceedings' of the Dublin Natural History Society (vol. i., p. 93—103) there is an interesting paper by Mr. G. H. Kinahan on "The Songs of Birds," in which the author states that July is the only month in which he has not heard the Dipper sing. The first time I ever heard the Dipper was on December 1st, 1866. Not knowing then that this bird is a winter songster I made a note of it. I again heard it on January 10th, 1867, and on the 18th of the same month. On February 4th, 1868, I find this entry in my note book—"I think the Water Ouzel *only* sings in winter." That remark has been since corroborated, for I have no recollection of ever having heard the Dipper in summer. December, January, and February are the singing months of the Dipper; the harder the frost and the heavier the snow the more he sings, and an observation which recorded the Dipper as singing on a hot day in June or July would be far more extraordinary than any record of its winter song. Dippers are common here.—RICHARD M. BARRINGTON (Fassaroe, Bray).

[We have heard the Dipper sing in May in Northumberland, on the Till near Wooler, and also during the first week of October at Llanberis and Pont Aberglaslyn, in North Wales, but do not remember to have heard its song during the summer months. But then it should be observed we have seldom been in the haunts of the Dipper at that season of the year.—ED.]

Sooty Shearwater in Norfolk.—On the 26th July, 1851, I obtained a Shearwater which was taken alive at Lynn, and which was recorded in 'The Zoologist' for that year (pp. 3234 and 3279), as well as in Morris's 'Naturalist' (vol. i., p. 189), under the name of *Puffinus cinereus*. At the suggestion of Mr. J. H. Gurney, jun., I borrowed this bird a short time since from the Lynn Museum, and we examined it together. It is certainly a young male (by dissection) of the Sooty Shearwater (*Puffinus griseus*).—T. SOUTHWELL (Norwich).

Nestling Grey Plover from the Orkneys.—I have long intended to call attention to the fact that a young Grey Plover in down, from the Orcades, is preserved in the Hope Collection at Oxford. Is this specimen *authenticated* or otherwise?—H. A. MACPHERSON (Carlisle).

[We are not aware that the breeding of the Grey Plover in the Orkneys has ever been ascertained or recorded. Of course the presence of a hind-toe would place the identity of the species beyond doubt, but we should like to know something of the history of the specimen.—ED.]

Ring Ouzel defending its Nest.—In 1868, when fishing one of the Dartmoor streams, I observed a Ring Ouzel in a very excited state, flying round me, and making at the same time a peculiar cry. I searched the banks of the stream for its nest, but not being able to find it, I resumed my rod, still followed by the bird. About eighty yards further on there grew a small shrub; when I got within a few feet of this, the Ouzel struck my hat, and again attacked me. This time I caught it in my landing-net. On examining the bush another bird flew out of its nest, which contained no eggs. This I suppose was the female, as on liberating my prisoner he flew after it, and I saw no more of them.—G. GYLES (Kilmurry House, near Waterford).

Great Grey Shrike near Croydon.—A specimen of this bird was caught by some bird-catchers at the bottom of Crohamhurst in November last, and was sold by them to our local taxidermist, Mr. C. Thorp. It was a mature female in good plumage.—FREDERICK LEE BERNEY (61, North End, Croydon).

Variety of the Red-backed Shrike.—A specimen of this bird, of an uniform creamy white colour, was shot at Belstead, near Ipswich, last summer.—HUGH TURNER (Ipswich).

Uncommon Birds near York.—On October 28th I had a fine specimen of *Anser albifrons* sent from Cottingwith. It was one of three which were all shot on the 27th or 28th. A female American Bittern was shot near Northallerton. I saw the bird in the flesh, and carefully compared it with a skin of the Common Bittern in my own collection, and am satisfied of its being the American species. Its gizzard contained the remains of field mice. On November 30th a male Bewick's Swan was sent to me from East Cottingwith. Length, 35 inches; expanse, two yards: weight, 13 lbs. 14 oz.; an adult bird. Early in December a Waxwing was seen about a mile from York, and an adult male Goldeneye was sent to me from Cottingwith.—J. BACKHOUSE, JUN. (West Bank, York).

FISHES.

Marine Fishes in Fresh Water.—Does the life or well-being of a fish whose natural habitat is the sea depend in any way upon the high specific gravity or salinity of the water? or may it not exist with equal comfort in fresh, provided that it can there obtain its normal food, and that the conditions are the same in other respects, with the one exception? Without taking into account the denizens of lakes and rivers, which migrate periodically to the ocean, or the sea-fish and crustaceans, which are in the habit of ascending streams for a considerable distance, it has been shown in aquaria that several species—*e. g.*, flounders, eels, and sticklebacks—thrive as well in one medium as the other, no difference in the aëration of the blood being perceptible. This being the case, might not any fish be "acclimatised," if one may use the expression, to a similar modification of its native element? The fact that seals, walruses, and other marine mammals can be kept in fresh water has, of course, as little to do with the matter as that sea-birds will float in a pond; but it seems to me that if this can be proved to be a mere question of gradual habituation, where fishes are concerned, no definite physiological obstacle existing, it will be a subject of importance to those who establish aquaria at a distance from the coast for purposes of study. Sea-vegetation, to the growth of which the marine salts are undoubtedly essential, could be supplied readily enough when necessary. Some years ago I purchased some sea-horses at a port in South America,—nine of them, I think,—and to my astonishment discovered that the vessel in which they had been kept contained fresh water. They had been caught three weeks or a month previously, and I suppose that the nigger who sold them to me had put them into the butt for the simple reason that it was too much trouble to fetch salt water from the shore—though he had a theory on the point wherewith to exculpate himself. At any rate, he assured me that none had died, and I regard the circumstance that he did not ask payment for any beyond the nine as stronger evidence of the truth of this assertion than anything that science could bring forward. As soon as I obtained possession of them I turned them into a large deck-tub full of sea-water immediately. Two hours later I found two of them dead, and the rest apparently moribund. It would have been very interesting to have worked out the cause of this, for, on such slender testimony as the one case afforded, I could not come positively to the conclusion that it was the salt water which was killing them, but I wanted to save my sea-horses, not to try experiments; accordingly I removed them from the briny fluid and restored them to fresh. The sick recovered, and reached Paris safely three weeks afterwards. They were there established in a fresh-water aquarium, but unfortunately fell victims to the rapacity of a small crocodile, which escaped from its proper tank one night before the sea-horses had enjoyed their new quarters a week. Sudden change of water will of itself often prove fatal to fish. At the Zoological Gardens, Regents Park, I was recently shown some young dace which had lived in a vase of water which had not been renewed for over two months; they were the survivors of a numerous company which had been repeatedly decimated by previous changes. The other day a gentleman gave me an account of some sea-anemones which he had imported into one of the midland counties from the Dorsetshire coast, together with a small barrel of salt water. They were placed in an aquarium, from which the dust was excluded as carefully as possible; a "high-water mark" was scratched on the glass, and week by week fresh water was added to supply the loss by evaporation and keep the contents of the vessel up to the original level. So situated the anemones, with some appropriate seaweeds, flourished for over a year. Then their owner brought back another barrel of water with him on returning from a visit to the seaside, treated his *Actiniidæ* with the entire sample of the English Channel, and killed them all.—ARTHUR STRADLING (29, Woodford Road, Watford).

Do Fishes Sleep?—The Berlin aquarium is especially well arranged or the scientific study of fish life, and lately it has settled a much-disputed point. "Do fishes sleep?" has often been asked, but never authoritatively answered. Older investigators denied the possibility, but lately this opinion has been changed in consequence of the following facts:—Generally the life of a fish is more monotonous than that of animals or birds. The fish devotes its time entirely to seeking nourishment. It does not regularly hunt its prey, though it is known that it is much more active at some times than at other times when it seems to rest quietly. This active state is more frequent, as even when the fish is apparently playing at rest it is still ready to seize on any passing prey; but when tired or satiated it remains quiet in a way that resembles the sleep of the beasts of prey. Generally fish hunt by night as well as by day; indeed some only commence their activity with the twilight, and rest during the day, in certain places, either lazily floating in the water, or hidden in the mud, their belly only visible. These facts have been lately proved by Dr. Hermes and others. In one division of the Berlin aquarium were about a dozen Carp, *Cyprinus carpio*, that commence in October to act curiously. From time to time the majority of the fish, occasionally all of them, would assume a crooked position, and remain so for hours, or until they were disturbed. When worms or other food were thrown into the water they would spring up to seize it, and immediately resume their old position. These fish were often very particular in choosing their resting-places. Some would examine carefully with their heads the surrounding rocks and stones, then slowly turn themselves over to the right or left side, and either remain quiet or swim away to seek some other place. Other fish would lie on the gravel, resting on their heads and tails, in the form of a bow. One carp always stood on its head with its body erect in the water—a veritable wonder of balancing that showed the capabilities of its fins. It was easy to arouse most of the fish by means of food or of a noise, but some of them slept so soundly that it was only possible to disturb them by hitting or shaking them repeatedly. The lidless, always open eye of the fish makes it difficult to distinguish its sleep from its periods of ordinary rest, but this last experiment was conclusive. The suggestion that this behaviour is the result of illness is answered by stating that this habit of sleep was observed nearly every day or more than six months, and during all that time the fish ate regularly, and were free from any appearance of sickness. It is possible that, as carp bury themselves in the mud during the winter, when they are free in the ponds, this behaviour in the aquarium was simply their usual winter sleep, modified by disturbances and their altered mode of life.—*Scientific American.*

[On this subject an interesting report of some original observations by Mr. W. R. Hughes will be found in 'The Zoologist' for 1874, p. 3895.—Ed.]

ANNELIDES.

Earthworms in New Zealand.—The following interesting observations form part of a communication, from Mr. A. T. Urquhart, to the editor of the 'New Zealand Journal of Science,' and appear in a late number of that periodical:—"In October, 1875, I dug a trench on some newly-cleared land—a raised beach at Manukau Harbour. The section then showed about 4½ inches of black mould and a horizontal layer, 1 inch thick, of burnt clay, wood-ashes, small stones, and pumice, lying on a brownish green arenaceous clay. The vegetation cleared was the growth of some thirty years. A portion of the land was left undisturbed. Measurements again taken a few days ago gave an average depth of 1¼ inch of turf, 5¾ inches of black mould, and there was no perceptible difference in the layer of ash. An angular block of trachyte—about twenty-five pounds in weight—placed in May, 1875, had sunk 1 inch, allowing for the turf." As the results of some accurate calculations as to the number of worms per acre, Mr. Urquhart gives results so considerably higher than Henson's, that he would have hesitated to publish them were he not in a position to prove them. Henson, it will be remembered by the readers of Darwin on 'Vegetable Mould,' calculates that there are 53,767 worms per acre in garden mould, and above half that number in corn-fields. Mr. Urquhart's estimates, founded upon digging about a quarter of an acre, as well as by a large number of tests on various parts of the fields, some that were under pasture for over sixteen years, gave from four to twenty-six Earthworms per each square foot. The alluvial flats, slopes, and richer portions of the upper lands would average eight to the square foot, or say 348,480 per acre. In the uncultivated fern-lands worms are scarce. In New Zealand worms not only leave their burrows, but climb up trees in search of food, this chiefly in the night time, though often until a late hour on damp warm mornings.

ARCHÆOLOGY.

Origin of the name "Daker-hen."—What is the derivation of the provincial name "Daker-hen," bestowed on the Landrail or Corncrake, and is it still in use anywhere? It may be found mentioned in the works of Willughby, Bewick, Montagu, Gilbert White, and other writers on Ornithology, but none of them explain its meaning. Yarrell does not mention it. It appears to be of some antiquity, and was in use in 1559. See Elyot's 'Bibliotheca' (sub voce *Crex*), perhaps better known as Cooper's 'Thesaurus,' since this Latin-English Dictionary of worthy Sir Thomas Elyot was, under a new name, revised and augmented after his death by Cooper, Bishop of Lincoln. The north-country verb *daker* signifies "to work for hire after the usual day's work is over." Can the term as applied to the bird have reference to its reiterated cry being heard after sunset, when most other birds have retired to roost? Another idea which has occurred to me is this:—The substantive "daker" or "dicker" (Greek, δεκα, *ten*), employed in the leather trade, means a roll of *ten* skins. For illustrations of the use of the word see 'Extinct British Animals,' p. 169. Can the term in this sense have been applied to the bird from its habit of repeating its monotonous note ten times (or thereabouts) in succession? In support of this suggestion it may be remarked that in some parts of the country Whimbrel, from their reiterated note, are known as "the seven whistlers." Again, can the term Daker have any connection with the family name Dacre, sometimes spelled Daker? Lower, in his 'English Surnames' (ii., p. 13), states that the arms of the Tyrwhitt family are "gules, three Tyrwhitts or Lapwings or," which he says is allusive, and from this doubtless arose the legend about Sir Hercules Tyrwhitt having been rescued from impending death by the cry of "pee-wit." Camden cites this amongst curious local surnames. Possibly there may be some legend of this kind in connection with "the Dacre hen," which may explain the bestowal of the name. The Rev. George Ornsby, in his Introduction to the 'Household Book of Lord William Howard of Naworth' (1612—1640), printed for the Surtees Society (vol. 68), in which frequent mention is made of Lord Dacre, "the Dacre of the North," alludes to the old war cry which three centuries ago was wont to summon all retainers for a foray on the Scottish border—"a Daker, a Daker." These are mere suggestions of mine, which to many may perhaps seem more plausible than satisfactory. Possibly some correspondent may be able to throw more light on the subject than I am at present able to do.—J. E. HARTING.

First Introduction of a Rhinoceros into England.—The 'London Gazette' of October 9th, 1684, contained the following notice:—"A very strange beast called a Rhynoceros, lately brought from the East Indies, being the first that ever was in England, is daily to be seen at the Bell Savage Inn on Ludgate Hill from nine o'clock in the morning till eight at night." Another advertisement, evidently relating to the same animal runs as follows:—"A true representation of the Rhinoceros and Elephant lately brought from the East Indies to London, drawn after the life, and curiously engraven in mezzo-tinto, printed upon a large sheet of paper. Sold by Pierce Tempest at the 'Eagle and Child' in the Strand, over against Somerset House Water Gate." This engraving must now be of some rarity, and we should be curious to learn whether the portrait is sufficiently faithful to enable an identification of the particular species of Asiatic Rhinoceros which was first imported to this country.

SCIENTIFIC SOCIETIES.

LINNEAN SOCIETY OF LONDON.

February 15, 1883.—Sir JOHN LUBBOCK, Bart., M.P., F.R.S., President, in the chair.

Mr. J. Jenner Weir exhibited a perfect hermaphrodite butterfly (*Lycæna icarus*), and a blue male and brown female of the same species for comparison. The hermaphrodite in question possessed two spotless blue wings on the left and two spotted brown wings on the right, thus being intermediate in colour between the two sexes.

Dr. W. C. Ondaatje exhibited a collection of thirty species of Ceylon corals, of which twenty were of a stony character. The series agree in the main with those of the Indian fauna; four are new species, namely, two of *Cœloria*, one of *Pavonia*, and one *Alcyonium*, the two latter, however, showing most affinity to forms met with in islands of the Pacific Ocean.

A paper was read "On the 'Manna,' or Lerp Insect, of South Australia," by J. G. Otto Tepper. This contains observations on the insect in question, and on the peculiar saccharine substance derived from it and deposited on various species of Eucalypt trees.

March 1, 1883.—Sir JOHN LUBBOCK, Bart., M.P., F.R.S., President, in the chair.

The following gentlemen were elected Fellows of the Society:—W. B. Barrett, L. J. K. Brace, J. B. Bridgman, W. O. Chambers, W. E. Clarke, W. Godden, F. H. H. Guillemard, J. C. Havers, T. M. Hocken, C. H. Middleton Wake, J. C. Stirling, and the Rev. P. W. Wyatt.

Mr. W. T. Thistleton Dyer called attention to, and made remarks on, the dried leaves and rind of the fruit of oranges from the Bahamas partially destroyed by *Mytilaspis citricola*, Packard.

Mr. A. W. Bennett read a paper "On the constancy of Insects in their visits to Flowers." He stated, as a summary, that the different classes of insects show very great difference in this respect. Butterflies exhibit but little constancy, except in a few instances; but they would appear to be guided to a certain extent by a preference for particular colours. The

Diptera exhibit greater constancy, though by no means absolute. A much greater degree of constancy is manifested by the Apidæ; and this becomes all but absolute in the hive-bee. It is an interesting circumstance that this constancy appears to increase in proportion to the part performed by the insects in carrying pollen from flower to flower. A much larger number of observations is, however, needed in order to determine with ceraintY any general law, and especially a careful microscopic examination of the pollen attached to the proboscis, mandibles, legs, and under side of the abdomen and thorax. As regards preference for particular colours, the Lepidoptera under observation paid 70 visits to red or pink flowers, 5 to blue, 15 to yellow, and 5 to white; the Diptera paid 9 visits to red or pink flowers, 8 to yellow, and 20 to white; the Hymenoptera paid 303 visits to red or pink flowers, 126 to blue, 11 to yellow, 17 to white.

There followed a communication "On the methodic habits of Insects when visiting Flowers," by Mr. R. M. Christy. The author records in detail the movements of 76 insects whilst engaged in visiting 2400 flowers. He tabulates the results, and concludes that insects do possess a decided preference for a number of successive visits to the same species of flower, although this is not invariably the case. Most of the observations were made on bees, which seem to perform the fertilisation of at least one half of all the flowers fertilised by insects in this country. Butterflies, as a rule, seem to wander purposelessly in their flight; nevertheless some species, including the Fritillaries, are fairly methodic. The author believes that it is not by colour alone that insects are guided from one flower to another of the same species, and the sense of smell is suggested. Bees, he avers, have but poor sight for long distances, but good sight for short distances. Of 55 humble bees watched, 26 visited blue flowers; 12 of the bees were methodic in their visits, 9 only partially methodic and 5 not so: 13 visited white flowers; 5 were methodic and 8 not at all: 11 visited yellow flowers, of which 5 were methodic and 6 not: 28 visited red flowers; 7 were methodic, 9 nearly so, while 12 were not. Mr. Christy inclines to the opinion, though admitting paucity of data, that bees in a flight from their nest confine their visits exclusively or principally to one species of plants.

The Secretary, Mr. G. J. Romanes, read "Observations on living *Echinodermata*." He stated that starfish possess a sense of smell which is not localised in any particular organs, such as the ocelli, but is distributed over the whole of the ventral surface. The function of the *Pedicillariæ* was shown by some further experiments corroborative of those already published by him, in the 'Philosophical Transactions,' to be that of seizing upon and arresting the movements of fronds of sea-weed in order to give the pedicels time to establish their adhesions. It was also shown that the righting movements of *Echinus* when inverted on its aboral pole (which are performed by means of the pedicels) are due to central co-ordination proceeding in part from the pentagonal nerve-ring surrounding the mouth, and in part from central nerve-matter distributed along the course of the radial nerve-trunks. One of the experiments whereby the fact of such central co-ordination (depending on a sense of gravity) was proved, consisted in rotating an inverted *Echinus* upon a wheel moving in a vertical plane. It was found that whatever phase in the righting manœuvre the *Echinus* might have attained at the moment when the rotation commenced was maintained so long as the rotation continued; but the manœuvre was resumed as soon as the rotation was allowed to cease. The paper concluded with an account of the effects of the various nerve-poisons on the *Echinodermata*.

There followed, in abstract, the 17th part of the Rev. R. Boog Watson's memoir on the Mollusca of the 'Challenger' Expedition. In this part the family *Pyramidellidæ* is dealt with, and descriptions given of twenty-three new species of the genus *Eulima* and one of the genus *Stylifer*.—J. MURIE.

ZOOLOGICAL SOCIETY OF LONDON.

February 20, 1883.—Prof. W. H. FLOWER, LL.D., F.R.S., President, in the chair.

Prof. F. Jeffrey Bell exhibited a selection of microscopical preparations received from the Zoological Station at Naples, and made some remarks upon them.

Mr. J. Jenner Weir exhibited and made remarks on an apparently hermaphrodite specimen of *Lycæna icarus*.

Mr. Sclater gave an account of the birds collected by Mr. H. O. Forbes during his recent expedition to Timor Laut, and exhibited the specimens. The species were fifty-five in number, sixteen of which were described as new to science under the follhwing names:—*Ninox Forbesi*, *Strix sororcula*, *Tanygnathus subaffinis*, *Geoffroius tenimberensis*, *Monarcha castus*, *Monarcha mundus*, *Rhipidura hamadryas*, *Myriagra fulviventris*; *Micrœca hemixantha*, *Grauculus unimodus*, *Lalage mœsta*, *Pachycephala arctitorquis*, *Dicæum fulgidum*, *Myzomela annabellæ*, *Calornis crassa*, and *Megapodius tenimberensis*. The general facies of the avifauna as thus indicated was stated to be decidedly Papuan, with a slight Timorese element, evidenced by the occurrence of certain species of the genera *Geocichla* and *Erythura*; while the new Owl, *Strix sororcula*, was apparently a diminutive form of a peculiar Australian species.

Prof. F. Jeffrey Bell read the second of his series of papers on the *Holothuroidea*. The present communication contained the descriptions of some new species which the author had discovered while examining the specimens of this group contained in the collection of the British Museum.

Dr. Hans Gadow read a paper on the suctorial apparatus of the *Tenuirostres*, pointing out that the tubular construction of the tongue in this group is produced by the overgrowth of the horny lingual sheath, the edges of which curl upwards and inwards.

A paper was read by Mr. L. Taczanowski, Curator of the Museum at Warsaw, in which he gave the descriptions of some new species of birds in the collection made by Dr. Raimondi during his recent explorations in Peru. The species in question were seven in number, belonging to six genera, namely: — *Carenochrous Seebohmi*, *C. Dresseri*, *Phytotoma Raimondii*, *Ochthæca Jelskii*, *Upucerthia pallida*, *Cynanthus griseiventris*, and *Psittacula crassirostris*.

Mr. Taczanowski also read a communication from Dr. Dybowski, in which the sexual differences between the skulls of *Rhytina stelleri* were pointed out.

A communication was read from Mr. G. B. Sowerby, jun., containing the descriptions of nine new species of shells and of the opercula of two known species.

March 6, 1883.—Osbert Salvin, Esq., F.R.S., Vice-President, in the chair.

The Secretary read a report on the additions that had been made to the Society's Menagerie during the month of February, and called attention to a female Panolia Deer, *Cervus eldi*, from Siam, received in exchange from the Jardin d'Acclimatation, Paris; a young male Thar, *Capra jemlaica*, presented by Lieut.-Col. Alex. A. A. Kinloch; and a male Blyth's Tragopan, *Ceriornis Blythi*, presented by Capt. W. Brydon, and received through the kind mediation of the Zoological Gardens, Calcutta.

The Secretary exhibited, on behalf of the Rev. F. O. Morris, the drawing of a bird shot in Hampshire in November, 1882, which it was suggested represented a Tinamou of some species that had escaped from captivity.

Mr. J. E. Ady exhibited some microscopical preparations of bone, in one case showing the growth of blood-vessels into cartilage previous to ossification, and in another case representing a hard section in which the lacunæ and canaliculi were extremely well shown.

Dr. Hans Gadow read a paper on the laryngeal muscles of birds, and pointed out, first, that the muscles of the syrinx are developed from the sterno-hyoid muscles, and, secondly, that the cutaneous muscles are derived from superficial layers of the common muscular stratum; thirdly, the author considered the connection between muscle and nerve-supply, illustrating his remarks by diagrams.

A communication was read from the Rev. H. S. Gorham, containing the descriptions of some new species of Coleoptera belonging to the family

Eurotylidæ. Twenty-nine new species of this family were described, of which ten were from the Philippine Islands, three from the Andaman Islands, two from Assam, two from the Malay district, six from Africa, and six from Peru. The species treated of belonged to the subfamilies *Encaustini* and *Dacnini*, the author reserving the other subfamilies for a future communication.

Dr. Gwyn Jeffreys read the sixth part of his communications on the Mollusca procured during the 'Lightning' and 'Porcupine' Expeditions. This included an account of the specimens of the groups of *Scissurella*, *Trochus*, *Turbo*, and part of *Littorina*, referable altogether to seventy species. Four genera and twenty species were for the first time described as new.

A communication was read from Mr. H. O. Forbes, describing a species of scarlet *Myzomela* obtained in the island of Boeroe, one of the Ceram group.

Mr. G. A. Boulenger read a paper on the Geckos of New Caledonia. The object of the author in preparing this paper was that it might serve as a guide to the identification of the *Geckotidæ* of New Caledonia, and at the same time to bring the synonymy into order. To this end the author had compared the typical specimens in the Museums of Brest, Lisbon, Paris, and Brussels with those in the British Museum, and had given short descriptions of every species taken from typical or well-authenticated specimens. The number of species of *Geckotidæ* actually known from New Caledonia was fourteen: of these two were recorded for the first time, one being new to science.—P. L. SCLATER, *Secretary*.

NOTICES OF NEW BOOKS.

Reports on the Scientific Results of the Voyage of H.M.S. 'Challenger' during the years 1873—76. Zoology; Vols. II.—VI.

SEVERAL more volumes of these valuable Reports have been published. In Vol. II. Prof. Moseley deals with the Hydroid, Alcyonarian, and Madreporian Corals, and furnishes descriptions of all the species dredged during the voyage, of which thirty-three are stated to be new. This Report is illustrated with sixteen plates and numerous woodcuts.

The collection of Birds, of which a Report, with several plates, has been prepared by Mr. P. L. Sclater, comprised about

900 specimens in skins, in addition to a large series in salt and spirits, and a collection of eggs.

Vol. III. includes an important and elaborately illustrated Report by Prof. A. Agassiz on the *Echinoidea*, and another by Dr. P. Hoeck on the *Pycnogonida*, of which a fine series was obtained during the voyage, thirty-three out of thirty-six species collected being described as new.

In Vol. IV. are three memoirs, all of much interest, and, needless to say, of scientific value, namely, Mr. Forbes' Report on the Anatomy of the Petrels, Prof. Haeckel's Report on the Deep Sea *Medusæ*, and the first portion of Dr. Theel's Report on the *Holothuroidea*.

Vol. V. contains a Report on the *Ophiuridea* by Theodore Lyman, and another by Dr. Cunningham on the anatomy of *Thylacinus cynocephalus*, *Phalangista maculata*, and *Phascogale calura*, based on specimens collected by the expedition.

In Vol. VI. Prof. Richard Hertwig gives a detailed and highly scientific account of the *Actiniaria*; while an equally elaborate Report on the *Tunicata* (*Ascidiæ simplices*) is furnished by Prof. Herdman.

These volumes, prepared under the superintendence of Sir C. Wyville Thomson, F.R.S., are published by order of Her Majesty's Government; and the plates, which have been executed in London, Paris, and Edinburgh, are perfect triumphs of the lithographer's skill.

The Micrographic Dictionary: a Guide to the Examination and Investigation of the Structure and Nature of Microscopic Objects. By W. J. Griffith, M.D., and Arthur Henfrey, F.R.S. Fourth Edition, edited by J. W. Griffith, the Rev. M. J. Berkeley, M.A., and T. Rupert Jones, F.R.S. 8vo. Parts XIII.—XXI., completing the work. London: Van Voorst. 1882-83.

The last part of this very useful Dictionary, of which we gave a notice in 'The Zoologist' for August last (p. 319), has just been published, and the work, in its fourth edition, is now complete. It forms two bulky volumes of more than 800 pages, the first embracing the text and the second the plates. These plates are fifty-three in number, and, with the addition of 818 woodcuts, contain figures of 2680 objects.

Looking to the length of many of the articles and the amount of information which they contain, it would have been no misnomer had the authors called their work an "Encyclopædia" instead of a "Dictionary." In their original prospectus it was described as "an index to our knowledge of the structure and properties of bodies revealed by the microscope": there can be no doubt, however, that it possesses many useful qualities beyond those strictly implied in the above definition; for the authors, without departing from the principal purpose of the work, have really furnished much more than a mere descriptive catalogue of objects, and the means of examining them; and a perusal of many of the articles will enable the reader, by the help of the system adopted, and references printed in small capitals, to acquire a general knowledge of particular departments of science.

The first edition was published in 1856. In this, the fourth, edition, the work has been thoroughly revised, and the systematic portions of the animal and vegetable kingdoms have been rearranged according to modern views, so far as is consistent with reference to existing standard treatises and monographs of the individual subjects. The structural portions also appear to have been enlarged, and corrected in relation to recent observations and experiments. This is as it should be, and the whole now forms a reliable and valuable work of reference.

One characteristic feature in the work deserves to be specially noted, and that is the bibliography which is given at the end of each subject. This is very useful. We have often had occasion to regret the absence of such aid in elementary works on Zoology, many writers appearing to think that the reader will require no further information than is inadequately compressed in a single text-book.

We are, therefore, glad to find that in the 'Micrographic Dictionary' the reader is furnished not only with an accurate digest on the classification and structure of the various objects described, but with the abbreviated titles of standard works of reference and important papers and monographs, in which a fuller exposition of the subject may be found, if wanted.

Rhopalocera Malayana: a Description of the Butterflies of the Malay Peninsula. By W. L. Distant. Royal 4to, with coloured plates. Parts I.—IV. London: The Author, care of West, Newman & Co., 54, Hatton Garden. Penang: R. Logan. 1882-83.

This work, which it is proposed to complete in seven or eight parts, and of which four are published, bids fair to be a most valuable contribution to the science of Entomology. The author has had the advantage of having himself collected many of the species he so well describes, having resided in the Province Wellesley and at Penang. He has been aided by the liberality of Mr. Logan, of Penang, whose collectors have been despatched to Quedah, Malacca, and Johore, and it is to that gentleman that the inception of the work is due. Many other collections have been examined, and Mr. Distant appears to have made himself familiar with the literature of his subject.

The work is much more than a mere dry monograph of Malay butterflies; it abounds in philosophical observations, and references are given to other authors who have dealt with the biology of the Lepidoptera.

The chromo-lithographic plates, by West, Newman & Co., of which there are four in each part, are excellent, and in most instances the representations are quite as good as if the more expensive painting by hand had been resorted to; indeed in one respect chromo-lithography has an advantage over the latter, inasmuch as greater uniformity is obtained, and it would be difficult to select one copy better than another.

It is very much to be regretted that the names of the insects figured are not given on the plates, for the name should, if possible, always appear in conjunction with the figure; references are then more quickly made, and the memory is materially assisted by the association.

To those who study the Diurnal Lepidoptera of the Indo-Malayan subregion the work will be indispensable.

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